

REMARKS

Claims 1, 2, 4, 6-9, 12, 24-26, 28-31 and 34-37 were pending in the above-captioned application, with claims 13-23 have been canceled as the result of a restriction requirement. Claims 1, 2, 6, 7, 12, 24, 28, 29 and 34-37 have been amended, and claims 38-50 added herein, in order to more clearly define and fully protect Applicants' invention. Allowance of all claims 1, 2, 4, 6-9, 12, 24-26, 28-31 and 34-50 is believed appropriate and is respectfully requested.

Applicants gratefully acknowledge the telephonic interviews conducted with Examiner Chan on April 5 and April 20, 2006. The April 5 telephonic interview was conducted with Examiner Chan and Bradley Reis, Dr. Julian Norley, Dr. R. Anderson Reynolds, III, and Melissa Dials of assignee Advanced Energy Technology Inc., and the undersigned. The April 20 interview was conducted with Examiner Chan and Mr. Reis, Ms. Dials and the undersigned.

During the telephonic interviews, the import of the cited art was discussed and claim amendments proposed. During the April 20 interview, it was agreed that specifying that the inventive graphite heat spreader is effective to spread heat along the plane of the spreader even in the absence of a heat sink would distinguish the claims of the above-captioned application from the art of record.

Objection and Rejection Under 35 U.S.C. §112

Claim 36 is objected to and rejected under 35 U.S.C. §112 in that the word "from" is misspelled and the fact that the term "1 meter" cannot describe a unit of area. Claim 36 has been amended herein to correct the noted errors, and the objection and rejection under 35 U.S.C. §112 should be withdrawn.

Claim Amendments and Newly Added Claims

The amendments made to independent claims 1 and 24 and newly added independent claim 44 specify that the inventive heat spreader is effective at spreading heat across a plurality of the heat sources even in the absence of a heat sink, and the spreader conducts heat along the plane of the one or more sheets of compressed particles of exfoliated graphite. As discussed during the telephonic interview of April 20, these amendments will distinguish the claims from the cited art.

Support for the amendments made to claims 1 and 24 and newly added claim 44 appears in the specification at paragraphs [0005], [0015], [0071] and [0072] which discuss the fact that, in the absence of a heat sink, hot spots during use of a display panel accelerate thermal deterioration, unless the inventive anisotropic heat spreader is employed.

The amendments made to claims 2, 7, 12, 29, 34, 35 and 37 merely make more clear that the claimed heat spreader is one or more sheets of compressed particles of exfoliated graphite, support for which is found throughout the specification of the above-captioned application.

The amendments made to claims 6 and 28 add the lap shear strength limitation deleted from independent claims 1 and 24.

Newly added independent claim 38 and claims 39-43 depending therefrom focus on the use of a pressure sensitive adhesive having a lap shear adhesion strength of at least about 125 g/cc. As discussed during the interview of April 5, this use of a pressure sensitive adhesive is an important advantage of Applicants' invention, in that it permits the adhesive to be applied and covered by a release layer (thus avoiding the need to apply the adhesive during the display panel manufacturing process), yet have an adhesive that adheres the graphite heat spreader to the display panel sufficiently to be maintained in position regardless of the orientation of the panel during manufacture, shipping or use. Nothing in the prior art discloses or suggests this unique use of a pressure sensitive adhesive.

Newly added claims 45-49 merely provide more detail on the nature of the claimed display panel and claim 50 merely specifies that the heat spreader of claim 24 can be a laminate of sheets of compressed particles of exfoliated graphite.

Rejections Under 35 U.S.C. §103

All pending claims stand rejected under 35 U.S.C. §103 over Morita et al. (U.S. 5,831,374) in view of Tzeng et al. (U.S. 6,245,400) or Morita et al. in view of Tzeng et al. and further in view of Brookes (U.S. 3,981,427).

As agreed during the telephonic interview of April 20, 2006, limiting the claims of the above-captioned application to a heat spreader which spreads heat laterally along the plane of the heat spreader, and that is effective even in the absence of a heat sink, effectively distinguishes the claimed invention from the cited art.

More particularly, the Morita et al. disclosure relates to a thermal interface material used to provide a heat pathway between the plasma display panel and a heat sink, which is an integral part of the Morita et al. system. In Morita et al., since the inventive concept of the patent revolves around the fact that heat sinks cannot conform to a curved plasma display panel. The material of Morita et al. is needed to "fill the gap" created between the heat sinking units and the curved panel. Moreover, the Morita et al. thermal interface material is formed of a pyrolytic graphite which, while possibly effective to transfer heat from the panel to a heat sink, would not be an effective heat spreader in the absence of a heat sink.

Additionally, in Morita, et al. the synthetic graphite material is provided as such, and an adhesive applied during the plasma display panel manufacturing

process. The claimed invention of the above-captioned application seeks to avoid the inefficiency of such an approach by pre-applying the adhesive to a heat spreader formed of compressed particles of exfoliated graphite and protecting the adhesive with a release liner, such that during manufacturing, one need only remove the release liner to apply the heat spreader.

Importantly, the disclosure and focus of Tzeng et al. shows that one skilled in the art would not be led to the invention of the above-captioned application even with the combination of the teachings of Tzeng et al. and Morita et al. More specifically, Tzeng et al. relates to a material formed of compressed particles of exfoliated graphite, a primer layer, an adhesive layer and a release liner, which, when used as a thermal interface, is positioned between a heat source and a heat sink. Again, the lateral spreading of heat, and the effective spreading of heat even in the absence of a heat sink is not even remotely suggested by Tzeng et al. Also, there is no disclosure in Tzeng et al. of the characteristics of the adhesive required for adhering a graphite sheet (whether natural or synthetic) to a plasma display panel. Indeed, since Tzeng et al. provides for the materials to be disposed between two surfaces under pressure, the need for a specific lap shear adhesion strength for the adhesive is not contemplated; rather, such a characteristic is wholly irrelevant. Thus, it is not merely optimization to provide for such characteristics; rather, it goes beyond the contemplation of the references.

Thus, even if combined, the cited patents cannot and do not suggest a process for applying heat spreaders to plasma display panels, where the heat spreader material is at least one sheet of compressed particles of exfoliated graphite, spreads heat along the plane of the sheet and is effective at performing a heat spreading function even in the absence of a heat sink. Indeed, the two primary references are so far afield of the claimed invention that patentability is believed to be clearly established. Furthermore, nothing in Brookes, which is wholly inapposite to the claimed invention of the above-captioned application provides any missing suggestion of obviousness.

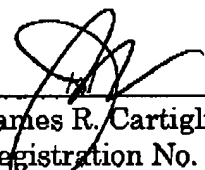
Therefore, the claims as amended are patentably distinguished from the art of record, as discussed during the April 20, 2006 telephonic interview, and, accordingly, all pending claims 1, 2, 4, 6-9, 12, 24-26, 28-31 and 34-50 should be allowed.

CONCLUSION

Based on the foregoing amendments and remarks, it is believed that allowance of all pending claims is appropriate. Such action is earnestly sought. If there remains any matter which prevents the allowance of any of these claims, the Examiner is requested to call the undersigned collect at 615.242.2400 to arrange for another interview which may expedite prosecution.

Applicants hereby petition the Commissioner for a two month extension of time to respond to the Office Action of December 22, 2005, extending the time to respond to May 22, 2006. The Commissioner is authorized to charge the extension of time fee of \$450 under 37 C.F.R. §1.17(a)(2), as well as the excess claims fee of \$800 under 37 C.F.R. §1.16 (based on 32 total claims and 4 independent claims), and for any deficiency attendant to this application or the filing of this response, to Deposit Account No. 50-1202.

Respectfully submitted,



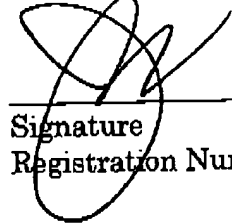
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CERTIFICATE OF FACSIMILE TRANSMITTAL

I hereby certify that this Response To Office Action, including Request for Continued Examination and Certificate of Facsimile Transmittal are being facsimile transmitted to the United States Patent and Trademark Office, Fax No. 571.273.8300 on April 27, 2006.

James R. Cartiglia



Signature

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